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EXAMINER

AJIBADE AKONAI OLUMIDE

ART UNIT

PAPER NUMBER

2617

MAIL DATE

DELIVERY MODE

12/15/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary****Application No.**

10/816,546

**Applicant(s)**

KRISHNAMURTHY ET AL.

**Examiner**

OLUMIDE T. AJIBADE AKONAI

**Art Unit**

2617

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 October 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/ICE)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Terminal Disclaimer***

1. The terminal disclaimer filed on September 16 2008 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of Patent Number 6,735,448 has been reviewed and is accepted. The terminal disclaimer has been recorded.

***Response to Amendment***

2. The declaration filed on September 16 2008 and October 6 2008 under 37 CFR 1.131 has been considered but is ineffective to overcome the Elbatt et al reference.

The evidence submitted is insufficient to establish diligence from a date prior to the date of reduction to practice of the Elbatt et al reference to either a constructive reduction to practice or an actual reduction to practice. Applicants have not submitted the Appendix A showing a first completed written description of the invention by April 20, 1999, as indicated in the declaration under 37 CFR 1.131 filed on September 16 2008 and October 6 2008. The Applicants' should provide the Appendix A or an exhibit that is sufficient to establish diligence from a date prior to the date of reduction to practice of the Elbatt et al reference to either a constructive reduction to practice or an actual reduction to practice.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

4. Claims 1-39 are rejected under 35 U.S.C. 102(a) as being anticipated by **Elbatt et al "Power Management for Throughput Enhancement in Wireless Ad-hoc Networks"** (hereinafter **Elbatt**).

Regarding **claim 1**, Elbatt discloses a wireless communication network (see page 1507, fig. 1) comprising: a set of  $n$  nodes (see fig. 1, page 1507, col. 1, line 16), where at least one of the  $n$  nodes comprises: an antenna element for transmitting and receiving a wireless signal (see fig. 1, page 1507, col. 1, lines 6-10); a detector element configured to determine a minimum transmittance power required to convey data to a cluster of nodes (all mobile nodes are able to determine minimum power level required to reliably transmit to a cluster indicating presence a detector element, see page 1507, col. 2, lines 37-42, page 1509, col. 2, lines 43-48, page 1510, col. 1, lines 1-11), the cluster comprising  $N$  nodes of the set of  $n$  nodes, wherein  $2 \leq N < n-1$  (see page 1508, col. 2, lines 33-41); and a transmit power adjustment element, operatively interfaced with the detector element, the transmit power adjustment element configured to provide the minimum transmittance power to the antenna element (providing minimum power that guarantees reliable communication to a cluster, indicating presence of a transmit power adjuster element, see page 1508, col. 2, lines 33-46, page 109, col. 2, lines 43-48, page 1510, col. 1, lines 1-20).

Regarding **claim 10**, Elbatt discloses a wireless communication device (see fig. 1, page 1507, col. 1, line 16) for use in a wireless communication network (see page

1507, fig. 1) comprising: an antenna element for transmitting and receiving a wireless signal (see fig. 1, page 1507, col. 1, lines 6-10); a detector element configured to determine a minimum transmittance power required to convey data to a cluster of nodes (all mobile nodes are able to determine minimum power level required to reliably transmit to a cluster indicating presence a detector element, see page 1507, col. 2, lines 37-42, page 1509, col. 2, lines 43-48, page 1510, col. 1, lines 1-11), the cluster comprising  $N$  nodes of a set of  $n$  nodes, wherein  $2 \leq N < n - 1$  (see page 1508, col. 2, lines 33-41); and a transmit power adjustment element, operatively interfaced with the detector element, the transmit power adjustment element configured to provide the minimum transmittance power to the antenna element (providing minimum power that guarantees reliable communication to a cluster, indicating presence of a transmit power adjuster element see page 1508, col. 2, lines 33-46, page 109, col. 2, lines 43-48, page 1510, col. 1, lines 1-20).

Regarding **claim 16**, Elbatt discloses a wireless communication network (see page 1507, fig. 1) comprising: a set of  $n$  nodes (see fig. 1, page 1507, col. 1, line 16), the set comprising a cluster of  $N$  nodes where  $2 \leq N < n - 1$  (see page 1508, col. 2, lines 33-41), a first node outside the cluster (see fig. 1, page 1507, col. 1, line 16), and a second node inside the cluster (see page 1508, col. 2, lines 33-41), wherein at least one node in the cluster of  $N$  nodes communicates directly with the other  $N-1$  nodes in its cluster (see page 1508, col. 2, lines 33-41), and the first node communicates with the second node via multiple hops (see page 1508, col. 2, lines 33-41); and the at least one node comprising: a detector element configured to determine a minimum transmittance

power required to convey data to a node within the cluster of nodes (all mobile nodes are able to determine minimum power level required to reliably transmit to a cluster indicating presence a detector element, see page 1507, col. 2, lines 37-42, page 1509, col. 2, lines 43-48, page 1510, col. 1, lines 1-11); and a transmit power adjustment element operatively interfaced with the detector element, the transmit power adjustment element configured to provide the minimum transmittance power to an antenna element (providing minimum power that guarantees reliable communication to a cluster, indicating presence of a transmit power adjuster element see page 1508, col. 2, lines 33-46, page 109, col. 2, lines 43-48, page 1510, col. 1, lines 1-20).

Regarding **claim 24**, Elbatt discloses a power-controlled wireless communication device for use in a network (see page 1507, fig. 1), the network having n nodes (see fig. 1, page 1507, col. 1, line 16), said power-controlled wireless communication device comprising: an antenna element for radiating and detecting signals (see fig. 1, page 1507, col. 1, lines 6-10), the antenna element configured to receive a signal from another wireless communication device (see fig. 1, page 1507, col. 1, lines 6-10); a detector element configured to determine a received power level of the received signal from the other wireless communication device (all mobile nodes are able to determine minimum power level required to reliably transmit to a cluster indicating presence a detector element, see page 1507, col. 2, lines 37-42, page 1509, col. 2, lines 43-48, page 1510, col. 1, lines 1-11), the other wireless communication device transmitting at a known transmit power level (see page 1507, col. 2, lines 37-42, page 1509, col. 2, lines 43-48, page 1510, col. 1, lines 1-11), the other wireless communication device

belonging to a cluster of nodes (see page 1508, col. 2, lines 33-41), the cluster having  $N$  nodes, where  $2 \leq N < n-1$  (see page 1508, col. 2, lines 33-41); and a connectivity table for storing an ID of the other wireless communication device and an associated transmit power level associated with the other wireless communication device (connectivity table, see fig. 4, page 1508), the associated transmit power level being calculated from the known transmit power level and the received power level (see equation (4), page 1510, col. 1).

Regarding **claim 2** as applied to claim 1, Elbatt the network having a first node outside of the cluster (see page 1508, col. 2, lines 33-41) and a second node within the cluster (see page 1508, col. 2, lines 33-41), wherein each node within the cluster of  $N$  nodes communicates directly with other nodes within the cluster, and the first node communicates with the second node via multiple hops (see page 1508, col. 2, lines 10-15, lines 33-41).

Regarding **claims 3, 11 and 17** as applied to claims 1, 10 and 16, Elbatt further discloses wherein at least one of the nodes is a power-adjustable node (providing minimum power that guarantees reliable communication to a cluster, indicating presence of a transmit power adjuster element, see page 1508, col. 2, lines 33-46, page 109, col. 2, lines 43-48, page 1510, col. 1, lines 1-20), the power-adjustable node further comprises a connectivity table for storing an ID and the minimum transmittance power associated with the power adjustable node within the cluster (connectivity table, see fig. 4, page 1508).

Regarding **claims 4 and 12** as applied to claims 1 and 10, Elbatt further discloses wherein the detector element determines the minimum transmittance power by comparing an attenuation of a signal originating at a first node within the cluster with a known transmittance power of the first node (see page 1509, col. 2, lines 20-38).

Regarding **claims 5 and 19** as applied to claims 1 and 16, Elbatt further discloses wherein the wireless communication network is an ad-hoc network of sensors (see page 1507 col. 1, line 16).

Regarding **claims 6 and 20** as applied to claims 1 and 16, Elbatt further discloses wherein the wireless communication network is an ad-hoc low-mobility network (see page 1507 col. 1, lines 16-19).

Regarding **claims 7, 13, 21 and 25** as applied to claims 1, 10, 16 and 24, Elbatt further discloses wherein the detector element periodically updates the minimum transmittance power required to convey data to the N nodes (see fig. 4, page 1508).

Regarding **claims 8, 14, 22 and 26** as applied to claims 1, 10, 16 and 24, Elbatt further discloses wherein the detector element dynamically determines an operating power level based on multi-hop data throughput (see page 1507, col. 2, lines 37-42, page 1509, col. 2, lines 43-48, page 1510, col. 1, lines 1-11).

Regarding **claims 9, 15, 23, 27, 31 and 27** as applied to claims 1, 10, 16, 24 and 28, Elbatt further discloses wherein the minimum transmittance power is selected based on interference zones and multi-hop data throughput (see page 1508, col. 2, lines 33-46, page 109, col. 2, lines 43-48, page 1510, col. 1, lines 1-20).

Regarding **claim 18** as applied to claim 16, Elbatt further discloses wherein the detector element determines the minimum transmittance power by comparing an attenuation of a signal originating at a third node within the cluster with a known transmittance power of the third node (see page 1509, col. 2, lines 20-38).

Regarding **claim 28**, Elbatt discloses a method for improving multi-hop network data throughput in wireless ad hoc networks by optimizing transmitter output power, the wireless ad hoc network having  $n$  nodes, the method comprising acts of: receiving a plurality of signals (see fig. 1, page 1507, col. 1, lines 6-10) from different wireless nodes (see fig. 1, page 1507, col. 1, line 16) in the wireless ad hoc network (see page 1507, fig. 1) wherein at least one received signal has a known transmittance power (see page 1507, col. 1, lines 29-35); calculating a degree of signal attenuation for at least one node in the cluster (see page 1509, col. 2, lines 20-30); and utilizing the determined degree of signal attenuation and the known transmittance powers to calculate a near optimal transmittance power (see page 1509, col. 2, lines 20-38), whereby a cluster of  $N$  neighbors is determined, wherein  $2 \leq N < n-1$  (see page 1508, col. 2, lines 33-41).

Regarding **claim 34**, Elbatt discloses a method of optimizing power consumption in a network, the network having a first node and a second node, the method comprising steps of: receiving a beacon signal from the first node at a known transmit power (see page 1509, col. 1, lines 27-30); measuring a received power level of the beacon signal at the second node (see page 1509, col. 1, lines 27-35); calculating a optimum transmit power from the second node to the first node based upon the known transmit power and the received power level of the beacon (see page 1510, col. 1, lines

1-20); and utilizing the optimum transmit power when sending data from the second node to the first node (see page 1510, col. 1, lines 1-20).

Regarding **claims 29 and 35** as applied to claims 28 and 34, Elbatt further discloses periodically updating the near optimal transmittance power (see page 1508, col. 2, lines 33-46, page 109, col. 2, lines 43-48, page 1510, col. 1, lines 1-20).

Regarding **claims 30 and 36** as applied to claims 28 and 34, Elbatt further discloses dynamically updating the near optimal transmittance power (see page 1508, col. 2, lines 33-46, page 109, col. 2, lines 43-48, page 1510, col. 1, lines 1-20).

Regarding **claims 32 and 38** as applied to claims 28 and 34, Elbatt further discloses wherein the method is applied to a network of sensor nodes (see page 1507 col. 1, line 16).

Regarding **claims 33 and 39** as applied to claims 28 and 34, Elbatt further discloses wherein the method is applied to a network of low-mobility (see page 1507 col. 1, lines 16-19).

Regarding **claim 37** as applied to claim 34, Elbatt further discloses wherein the near optimal transmittance power is calculated so as to minimize interference zones and maximize multi-hop data throughput (see page 1508, col. 2, lines 33-46, page 109, col. 2, lines 43-48, page 1510, col. 1, lines 1-20).

### ***Conclusion***

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to OLUMIDE T. AJIBADE AKONAI whose telephone number is (571)272-6496. The examiner can normally be reached on M-F, 8.30p-5p.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Appiah can be reached on 571-272-7904. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

OA

/Charles N. Appiah/  
Supervisory Patent Examiner, Art Unit 2617